Anthophila massaicae sp. n. (Choreutidae) a remarkable case of parallel evolution

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Abstract. A new species of *Anthophila* Haworth, 1811 (Choreutidae) is described from East Africa which shows remarkable similarity to the Palaearctic *Anthophila fabriciana* (Linnaeus, 1767). The life history is described and comparisons are drawn between the species.

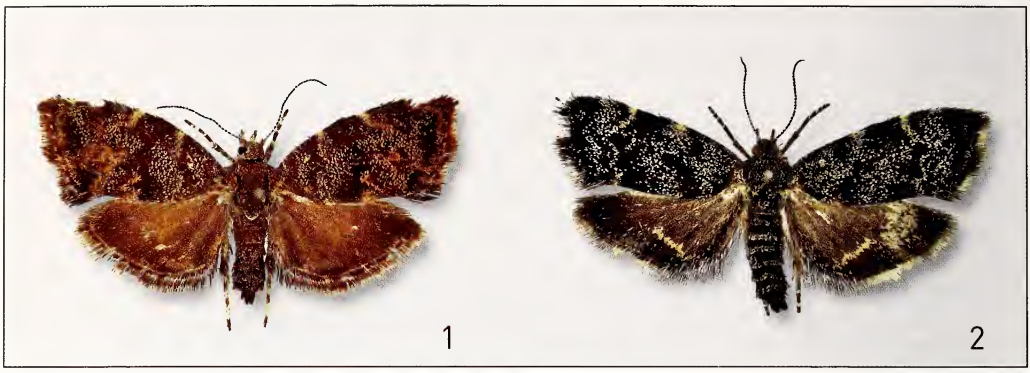
Introduction

When I went to live in Kenya in 1998, at an altitude of 2,500 m just 70 km south of the equator, I was immediately struck by the familiar appearance of many moths, especially of the Geometridae, Larentiinae. This is in marked contrast with the fauna at lower altitude. I was again surprised to net a species which seemed like *Anthophila fabriciana* (Linnaeus, 1767). There is a local nettle, *Urtica massaica* Mildbr. (Urticaceae), which is described by Agnew & Agnew (1994) as "A painful stinger, often growing on abandoned tracks in montane forest areas, and often associated with the presence of buffalo, 2000–3400m." It has indeed a more vicious sting than the European *U. dioica* Linnaeus, but fortunately its presence does not always indicate buffalo in residence! There was some near our house and when I searched it, there were larvae resembling *Aglais urticae* (Linnaeus, 1758) (later identified as the similar, but smaller *Antanartia abyssinica jacksoni* Howarth) as well as larvae of a species feeding in the same manner as *A. fabriciana* and with a very similar appearance. When reared these also superficially resembled *fabriciana*. Dissection and closer examination revealed that they were very different.

Anthophila massaicae sp. n. (Figs 1, 3, 5–8)

Material. Holotype ♂, 'Kenya, Rift Valley | l. *Urtica massaica* | em. 20.xi.1999 | D.J.L. Agassiz'. – Paratypes: 3♂ same locality as holotype, em. i.vi.1999 (D.J.L.A. slide No. 873), em. 4.vii.1999 (D.J.L.A. slide No. 993), and (not bred) 13.ix.1998; 8♀ same locality, em. 20.vi.1999, em. 22.vi.1999 (2), em. 24.vi.1999, em. 25.vi.1999 (3) including (D.J.L.A. slide No. 995), em. 29.vi.1999 (D.J.L.A. slide No. 994). Also 2♂, 4♀ 'Kenya: Central | Mweiga 2000m | 0° 19.5' S, 36° 56'E | l. *Urtica massaica* | em. 9–12.ix.2007 | D.J.L. Agassiz'. The holotype and 4 paratypes will be deposited in the National Museums of Kenya, Nairobi, 4 paratypes in the Natural History Museum, London, and the remainder in my collection.

Diagnosis. In posture and coloration the adult closely resembles *A. fabriciana* (Fig. 2), but this latter species has patches of white terminal cilia and on the hindwing there is a partial white subterminal line, also the abdominal segments are edged posteriorly with whitish scales. The genitalia of *fabriciana* are illustrated e.g. by Pierce & Metcalfe (1935) and Diakonoff (1986) and are much more elaborate in both sexes. The larvae of the two species and their mode of feeding are very similar.



Figs 1–2. Adults of *Anthophila*. **1.** *A. massaicae* sp. n. **2.** *A. fabriciana* (L.).

Description of adult (Fig. 1). Wingspan: 11–12 mm. Head fuscous mixed whitish, especially on face; labial palpus clothed with fuscous and whitish scales, segment 2 tufted beneath; antenna ringed black and white, male finely ciliate, female simple. Thorax and tegulae fuscous with scales tipped whitish. Forewing fuscous, a diffuse subbasal fascia consisting of a scattering of white scales, an irregular antemedian fascia, pale ochreous at costa then a broad scattering of white scales across wing, a similar postmedian fascia, further white scaling in subterminal area; terminal cilia fuscous but paler below apex; underside with markings along costa matching those on upperside. Hindwing fuscous, a dark fuscous cilia line; underside heavily irrorate white. Legs banded dark fuscous and white.

Male genitalia (Figs 6, 7). Uncus simple, gnathos absent, valva simple, clothed with long spines, saccus subtriangular, juxta with three prongs. Phallus slender and simple without cornutus. Tergite VIII with a narrow sclerotised bar.

Female genitalia (Fig. 8). Ostium a wide shallow cone, ductus long and narrow, corpus bursae ovate, some slight scobination especially posteriorly, signum near junction with ductus comprising a scobinate undulating ridge.

Larva (Fig. 3). When full fed about 12 mm in length, head honey-coloured, body dull pale green, a subdorsal row of raised black spots, one on each thoracic segment, two on each abdominal segment, a lateral row of black spots, one per segment, spiracles black with two or three setae, legs black

Life history. The larva lives in a slight web on the upper surface of leaves of *Urtica massaica* (Fig. 4). The pupa is in an opaque white cocoon

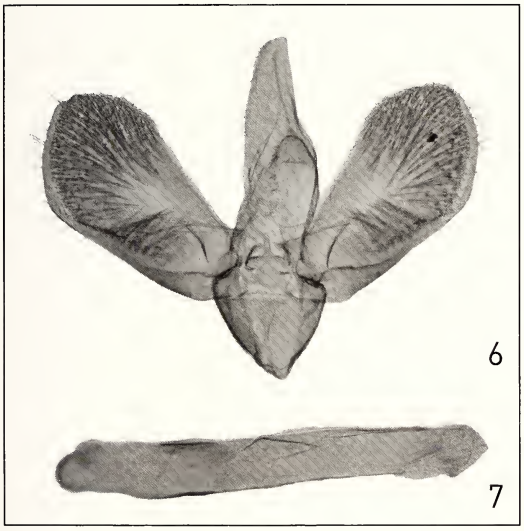
Distribution. Kenya, above 2000m. Recorded from both East and West of the Rift Valley.

Etymology. the name is taken from the specific name of the host plant.

Discussion

Seven species of *Choreutis* are listed in Vári et al. (2002) from Southern Africa. These were checked in the collections of the Natural History Museum, London and

Figs 3–5. Larva *Anthophila*. **3.** *A. massaicae* sp. n. **4.** *A. fabriciana* (L.). **5.** *Urtica massaica* with a web of *A. massaicae* sp. n.

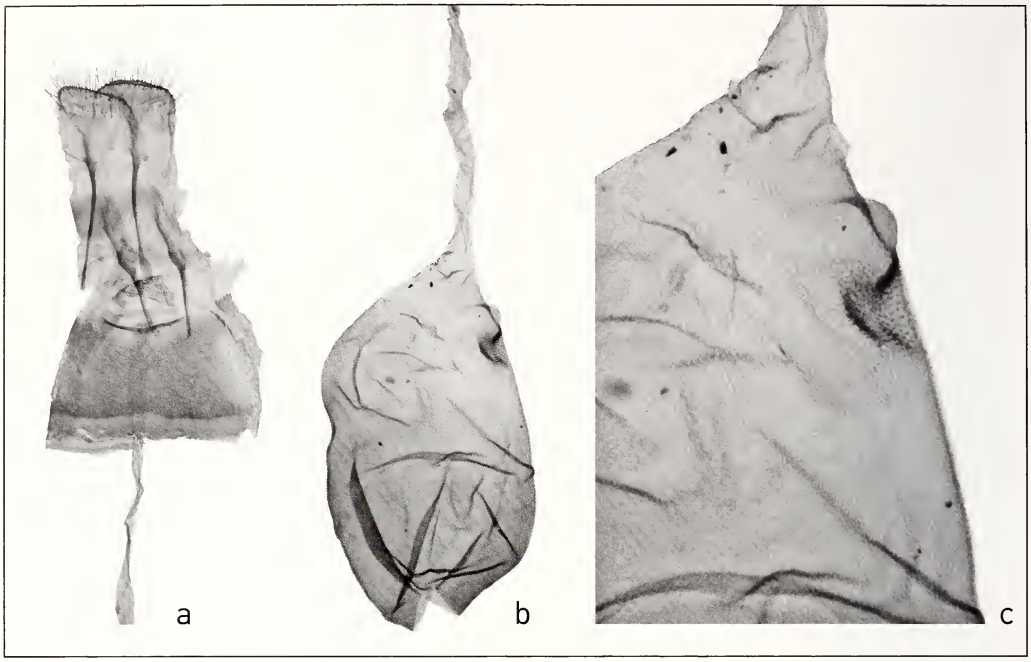


Figs 6, 7. Male genitalia of *A. massaicae* sp. n. **6.** Genitalia without phallus. **7.** Phallus.

none matched this species. Nor did any other species appear similar. African Choreutidae have been little studied since Meyrick - I myself have taken eight other species of the *Choreutis/Anthophila* genus group in East Africa, seven of which do not match described species.

The new species is placed here in the genus *Anthophila* somewhat tentatively. Diakonoff (1986) uses various characters to separate the genera for Palaearctic species, but includes in *Anthophila* species with differing genitalia. Clarke (1969) lists 37 Meyrick species in the genus *Anthophila* which have widely differing genitalia. It is hard to know which are the most ancestral traits without a thorough revision of this family.

Convergent evolution is used to describe similar appearance and habits arising from creatures with widely separated phyletic lines; parallel evolution is the term used to describe similar species which are related, but have developed similarities after they have been isolated from each other. Clearly this is a case of parallel evolution, but the common roots of species in the Palaearctic and the Afrotropical regions must be a long time in the past. It is difficult to imagine what are the selective constraints which have caused moths to develop the same characteristics, whilst feeding on related plants in these two separate biogeographical regions.



Figs 8a–c Female genitalia of *A. massaicae* sp. n. **a.** Terminal abdominal segments and ductus bursae. **b.** Corpus bursae. **c.** Detail of signum.

Diakonoff (1986) writes (of *Anthophila*) "Also occurring in the United States with vicariant New World species." In addition Ole Karsholt (pers. comm.) has found a similar species on nettle in Peru. It would be very interesting to know whether nearctic or neotropical species have gone through the same evolutionary process.

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